

WHAT IS CLAIMED IS:

1. A semiconductor device having at least one thin film transistor, said thin film transistor comprising:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer,

wherein said semiconductor layer comprises crystals arranged in a direction substantially parallel with a length direction of said channel formation region,

wherein a standard deviation of S-value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type.

2. A semiconductor device according to claim 1, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than  $1 \times 10^{18}$  atoms/cm<sup>3</sup>.

3. A semiconductor device according to claim 1, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

4. A semiconductor device having at least one thin film transistor, said thin film transistor comprising:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and



8. A semiconductor device according to claim 7, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than  $1 \times 10^{18}$  atoms/cm<sup>3</sup>.

9. A semiconductor device according to claim 7, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

10. A semiconductor device having at least one thin film transistor, said thin film transistor comprising:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer,

wherein said semiconductor layer comprises crystals arranged in a direction substantially parallel with a carrier flow direction between said source and drain regions,

wherein a length of said channel formation region is 0.01 to 2  $\mu\text{m}$ .

11. A semiconductor device according to claim 10, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than  $1 \times 10^{18}$  atoms/cm<sup>3</sup>.

12. A semiconductor device according to claim 10, wherein said semiconductor device is incorporated into an

electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

13. An active matrix display device comprising:  
a pixel matrix circuit formed over a substrate;  
a logic circuit formed over said substrate, said logic circuit having thin film transistors,  
wherein each of said thin film transistors comprises:  
a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and  
a gate electrode formed adjacent to said semiconductor layer,  
wherein said semiconductor layer comprises crystals arranged in a direction substantially parallel with a length direction of said channel formation region,  
wherein a standard deviation of S-value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type.

14. An active matrix display device according to claim 13, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than  $1 \times 10^{18}$  atoms/cm<sup>3</sup>.

15. An active matrix display device according to claim 13, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.

16. An active matrix display device comprising:  
a pixel matrix circuit formed over a substrate;  
a logic circuit formed over said substrate, said  
logic circuit having thin film transistors,  
wherein each of said thin film transistors  
comprises:

a semiconductor layer formed over a substrate, said semiconductor layer having source and drain regions and a channel formation region interposed therebetween; and

a gate electrode formed adjacent to said semiconductor layer,

wherein said semiconductor layer comprises crystals arranged in a direction substantially parallel with a carrier flow direction between said source and drain regions,

wherein a standard deviation of S-value of said thin film transistor is within 10 mV/dec for an N-channel type and 15 mV/dec for a P-channel type.

17. An active matrix display device according to claim 16, wherein said semiconductor layer contains a metal element for promoting crystallization at a concentration of not higher than  $1 \times 10^{18}$  atoms/cm<sup>3</sup>.

18. An active matrix display device according to claim 16, wherein said semiconductor device is incorporated into an electronic apparatus selected from the group consisting of a TV camera, a head mounted display, a car navigation, a portable telephone, a video camera and a projector.